



PAINT CAN ROCKETS

MATERIALS:

Empty Quart Paint Cans Baking Soda Mallet
 Vinegar Styrofoam/Plastic Cups
 Safety Goggles Paper Towels

VOCABULARY:

Rocket	Physics	Chemistry
Table	Matter	Solid Liquid
Gas	Pressure	Newton's Laws
Inertia	Force	Acceleration
Mass	Gravity	Thrust

DIRECTIONS:

1. Safety first! Put on your safety goggles!
2. This is an outdoor experiment! Set up a table or launch the rockets right off the ground- but only do this outside!
3. Place a paint can on the table.
4. Use a cup to add about a cup of baking soda to the can. The cup must be small enough to fit in the can, but hold at least 1 cup of vinegar/baking soda.
5. Fill a cup with vinegar.
6. Carefully place the cup inside the can on top of the baking soda.
7. Use the mallet to gently tap the lid onto the can to seal it.
8. Option 1: Pick up the can and gently shake it with the lid facing away from your face- it should pop open and send the lid flying. There will also be vinegar splattering, so be careful.
9. Option 2: Flip the upside down onto the table and stand back. The can will eventually pop and should send the can flying into the air.

THE STEAM BEHIND THE EXPERIMENT:

As the baking soda and vinegar, carbon dioxide is released inside the can. Pressure from the gas builds and eventually pops the lid off. The thrust, or push, of your paint can is related to how much pressure built up inside the can before the top popped off.

This activity demonstrates Newton's Three Laws of Motion:

1. An object at rest will stay at rest, and an object in motion will stay in motion, until an unbalanced force acts upon it. (For this experiment, the paint can is not going to move by itself. We have to apply a force. In this case, we use pressure from carbon dioxide gas build up inside the can. The can does not stay in motion forever because of gravity and drag from air molecules).
2. Force = Mass x Acceleration. (For this experiment, the can does not have a lot of mass, so it does not take lot of force to move it. The more pressure that builds up, the more force is applied, and the higher or further the can will fly).
3. For every action, there is an equal and opposite reaction. (For this experiment, we flip the can upside down. When the pressure makes it pop, it pushes down, which makes the can go up!).

MAKE IT AWESOME:

Use paper and tape to make fins and a nose cone to transform the can into a rocket!



EXTENSIONS:

1. What happens when you change the amount of baking soda or vinegar used?
2. What happens if you use a different sized can?
3. What other changes can you come up with for this experiment?

VIDEOS AND WEBSITE LINKS:

1. Steve Spangler Paint Can Rockets: <https://youtu.be/ozGsync74Mss?si=X5QM5azkIG7i9PHZ>
2. Alka Seltzer Official Website and Directions: <https://www.alkaseltzer.com/original/science-experiments/rockets>
3. King of Random Alka Seltzer Rocket Video: <https://youtu.be/os0my8Y5qmA>
4. Soda Bottle Alka Seltzer Rockets: <https://thehomeschoolscientist.com/how-to-make-a-rocket-with-alka-seltzer/>
5. Easter Egg Rocket: <https://team-cartwright.com/easter-egg-rocket/>

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